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| **Architecture Design** |
| Human Resource Management Project |
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| This document describes the architecture design for Human Resource Management (HRM) project. In this document, the view, including static view, physical view, and dynamic view will be shown. In addition, the data model will be described in this. |
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| **KIM TUONG** |
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**Revision History**

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| **Date** | **Version** | **Author** | **Description** |
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1. Documentation roadmap

# Scope

This document covers following:

* Client’s vision, project goals, context, and constraints of the system being developed
* Architectural drivers (high level functional requirements, quality attributes, and constraints) and prioritized utility tree
* Architectural views
* Architectural decisions
* Tradeoff analysis

The specification is intended for the following audience:

* Stakeholders for the Human Resource Management(GSD) project
  + - * Team HRM-PIM
* Van Lang’s IT Faculty
  + - * Audience that might want to get an insight into or analyze the architecture and the design of the HRM project

# 1.2 Document organization:

This document includes three important parts:

**Part 1:** How to read this document

**Part 2:** System overview- The summarize of architectural drivers (High level requirement, quality attribute and constraint)

**Part 3:** View

*Physical* – How software and hardware interact with each other.

*Static* – The module of HRM system.

*Dynamic* – The interaction between HRM components.

The structure for presenting the view

**Session 1**: Primary presentation- The figure to present the view

**Session 2**: Element catalog – The table for describing the element which present in figure

**Session 3**: Element behavior- The flow of each component (This part is just for Dynamic perspective)

**Session 4:** Architecture background- Includes design decision and reasons for designing

1. System overview:

# Project Overview

**Project name:** Human Resource Management Program

**Clients:** Human Resource Department- Van Lang University

**Mentors:** Quang Nguyen (Van Lang University)

**Developer team:**

* Nhung Huynh- Team leader
* Tan Tran
* Tuong Nguyen
* Nguyen Dinh
* Dang Nguyen
* Loc Phan
* Quyet Nguyen
* Tung Nguyen

# Project Background

Human Resource Department in Van Lang University gets used to manage personal information in MS Excel. Now they need a new tool that supports only for managing human resource in Van Lang.

The vision of the project is to develop personal information management. In the future, the system will develop other function related to payroll, insurance information…

# **Project Goal**

HRM is particularly developed for human resource management in university colleges. The system consists of key modules:

* Personal information management
* Employee labor contract management
* Recruitment & training processing
* Payroll
* Administration panel – Utilities

1. System Context:

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| --- | --- |
| **Actor** | **Description** |
| Educated Department |  |
| Administrator |  |
| Salary Group |  |
| Department |  |
| HR Group |  |
| Account Department |  |

*Figure 2: System Context of HRM project*

1. Architecture drivers:

*See more in Architecture Driver Document*

1. Architecture Style/Patterns & Tactics:

This section discusses the architectural styles and patterns that the HRM architecture possesses. It also provides rationale for selection of these styles.

# Styles/ Pattern

We identify that the style that will be used in HRM- PIM (Personal Information Management) project will be client and server style based on the architecture analyzing. Following is the rationale for choosing client and server as the style for the HRM- PIM project:

* Personal information data needs to be shared with all authorized users. Users can access these data from globally distributed locations and number of users may range from 10 to 50. In order to achieve these requirements and qualities, we decided to have a PIM server that would store and manage data.
* HRM project is web application, all user will access via Web browser with Silverlight runtime is available as a [plug-in](http://en.wikipedia.org/wiki/Plug-in_(computing)) for [web browsers](http://en.wikipedia.org/wiki/Web_browser). The PIM server will provide service based on the requests from client.

**Tiered Architecture:**

In more detail, we decided to use tiered architecture to separate the client, server and database to enhance the security and modifiability. The first tier consists of PIM client. The second tier consists of business services. The third tier provides data management services which using Entity Framework. We will delve into details in later sections.



**Figure 5.1.1 Client and server style for HRM-PIM application**

In this solution, there is a PIM server that responsible for providing the appropriate services that are invoke by the client. The PIM server will also store the data object mapped with Database server and The PIM client will invokes service for manage the personal information such as read and write data in to database, report, import, export data…The user will uses Web browser to access to the PIM Client.

# Tactics used

1. **Modifiability**

*Localization of changes*

We grouped together the components that we anticipated to be affected by the similar kind of changes. E.g. we grouped the view components together; view-model components together… We tried to generalize these modules based on their functions.

*Separation of concern*

Based on the functional requirements, we categorized elements into different sets of components so that the developers can add new components or delete components without affecting the other components.

*Defer binding time.*

The application allows the end user or system administrator to make settings or provide input that affects behavior. E.g. The system administrator can change role permission or assign role in configuration file.

1. **Performance**

*Maintain multiple copies of either data or computations*

We have decided to use caching of data in server level by using Entity Framework. With Entity Framework, we can eliminate the direct data accessing to database which require amount of time for each transaction.

1. **Usability**

**Long running operations**

As most of the operations in the HRM- PIM are going to take time, we are going to design the UI components such that they do not halt when certain long running operations are in progress. We will design asynchronous invocations for such operations by using WCF- RIA services

**Maintain a model of the task**

The model of the task to be performed would be maintained to determine context, such that HRM-PIM system can have an idea of what the user is attempting and can provide assistance. For example, the users would not need to re-enter the same data again, once the data is obtained for the first time, the related information like project name, its components, resources etc, would be pre-populated. This would save time and resources at the users end to perform a task.

**Design time tactics**

Separating user from the rest of the application: we are using Model View View-Model (MVVM) pattern. E.g. UI views form the view, each views will have the corresponding view-models and the models will consists the action in UI controls

1. Architecture Overview:

# Component and connector views

# Primary Presentation



**Figure 6.1.1 High level C&C view of the HRM-PIM system**

The figure 5.1.1 depicts the client and server style. PIM client is a client of PIM server and Database Server is system database.

# Element catalog

Following table describes responsibilities of the different element

|  |  |
| --- | --- |
| **Component** | **Responsibility** |
| PIM Server | This component run contains all service components, business objects and data persistence mapped with PIM Database server. PIM server will provide the appropriate services whenever they are invoked by client. These services will be the business service of Personal Information Management and Authentication Service. These service components will be descripted later in Server decomposition.  PIM Server also contains data objects mapped with database in data server. These objects use Entity Framework |
| PIM Client | PIM client runs in Silverlight platform. It invokes the service from PIM server. It can read the data file and update the database on the PIM database server. PIM client also performs authentication of the user. |
| PIM Database Server | This component is SQL Database Server of HRM- PIM system. It contains data that will be used in all system. |
| Security Manager | This component is developed by other team. It responsible for authorization and it will be called by System Administration component in PIM Client. |
| Web browser | PIM client will be accessed by user via this component. Web browser must be available the Silverlight plug-in. |
| Configuration file | This file contains the Web configuration (host information) for running service. |
| Data files | Data files are the files that need to be imported in Database server. E.g. The import service can only import data in Excel files. |

Following table describes connector used

|  |  |
| --- | --- |
| **Connector** | **Purpose** |
| WebServiceCallReturnConn | This connector represents a web service call made by a caller to a callee. The information is transferred over http(s) connection. |
| FileReadWriteConnT | This connector allows a “user” role to read from or write to a disk file. |
| Server-DatabaseConnT | This connector represents a connection between the server and the database server. In fact, this is the connection between the data object and database by using the ADO.NET Entity Framework |
| CallReturnConnT | Caller calls a certain method of callee and callee performs the requested oprtation and returns the result back to the caller. |